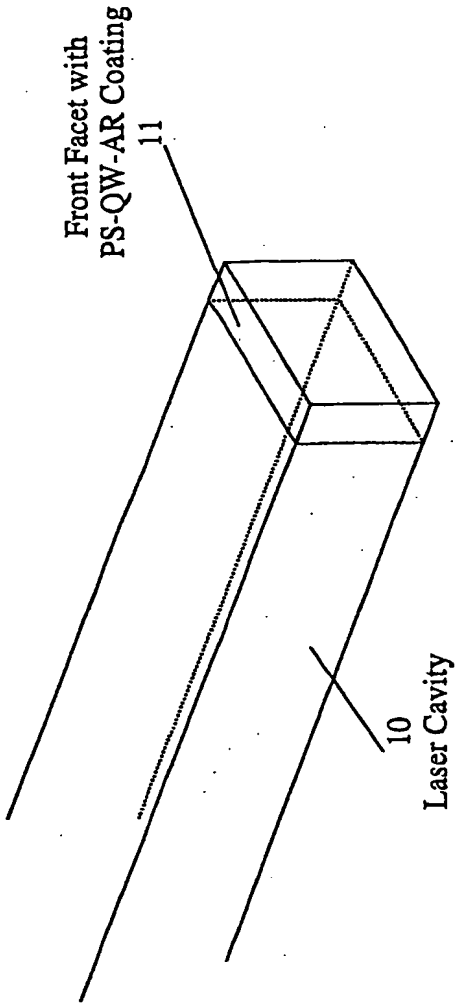


Fig. 1

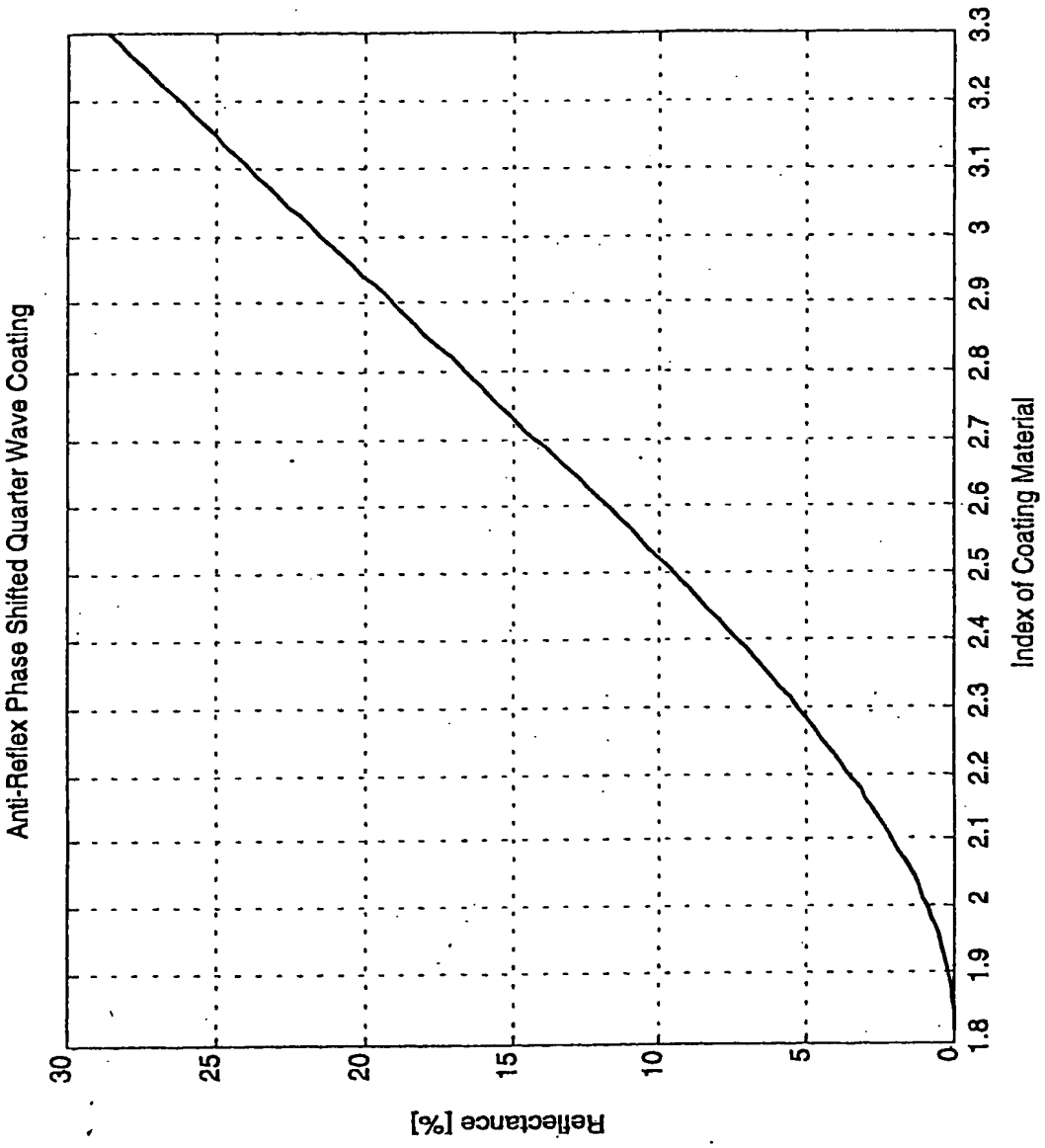

Anti-Reflex Phase Shifted Quarter Wave Coating
Reflectance [%]
30
25
20
15
10
5
0
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
3.1
3.2
3.3
Index of Coating Material

Fig. 2

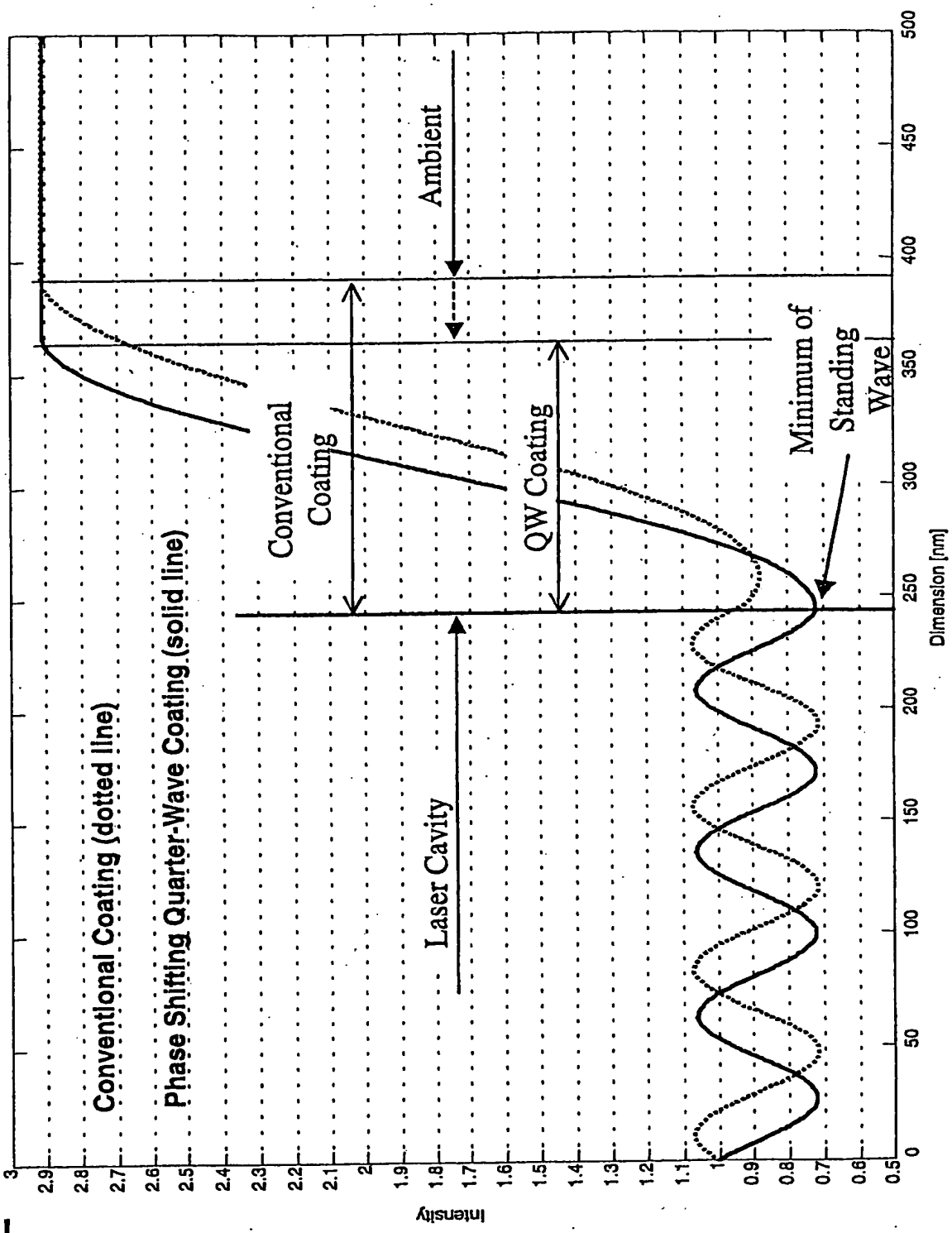

Conventional Coating (dotted line)
Phase Shifting Quarter-Wave Coating (solid line)
Ambient
Conventional Coating
QW Coating
Minimum of Standing Wave
Laser Cavity
Intensity
Dimension [nm]

Fig. 3

Fig. 4(a)

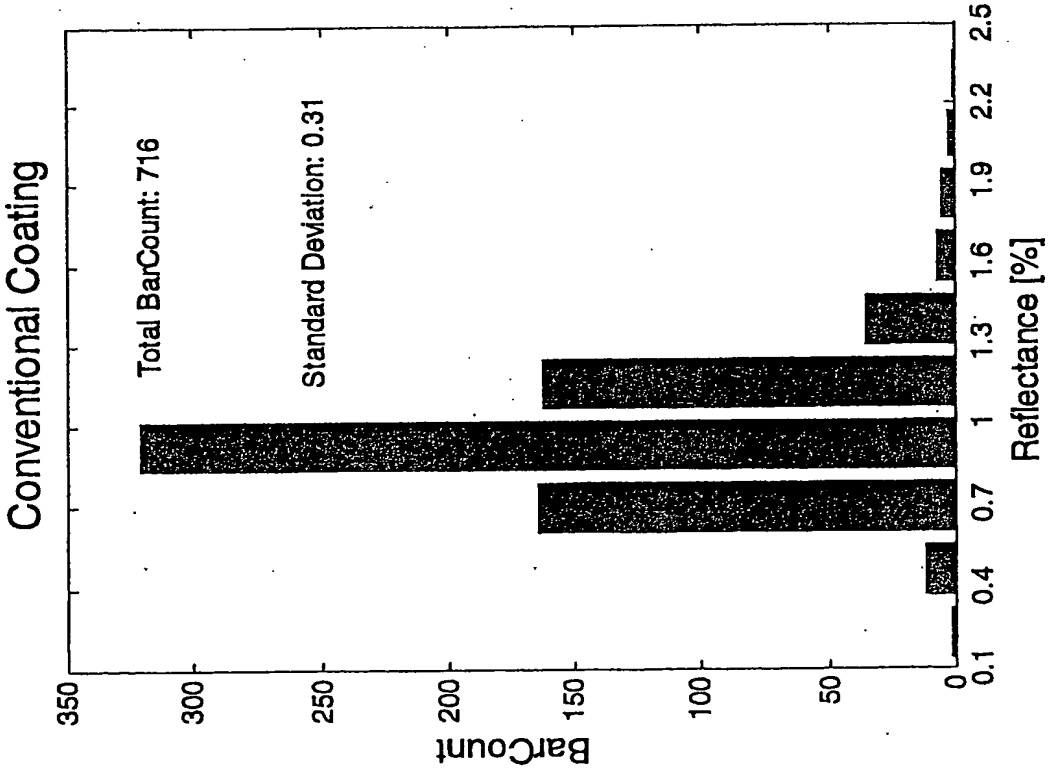
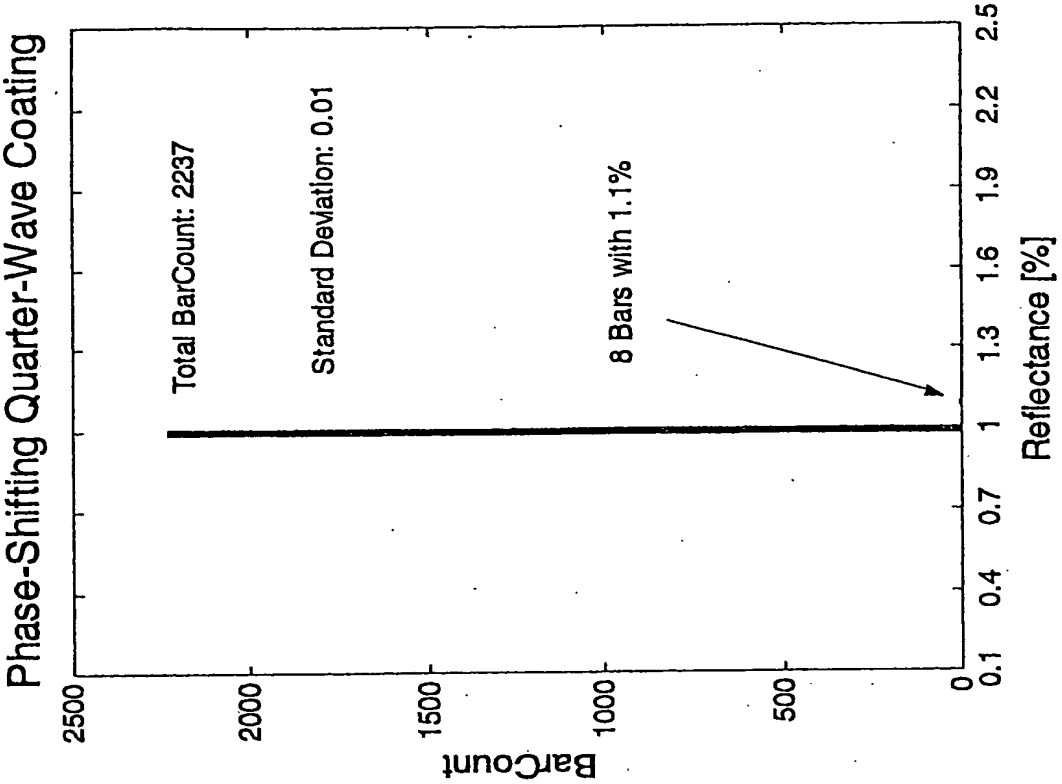
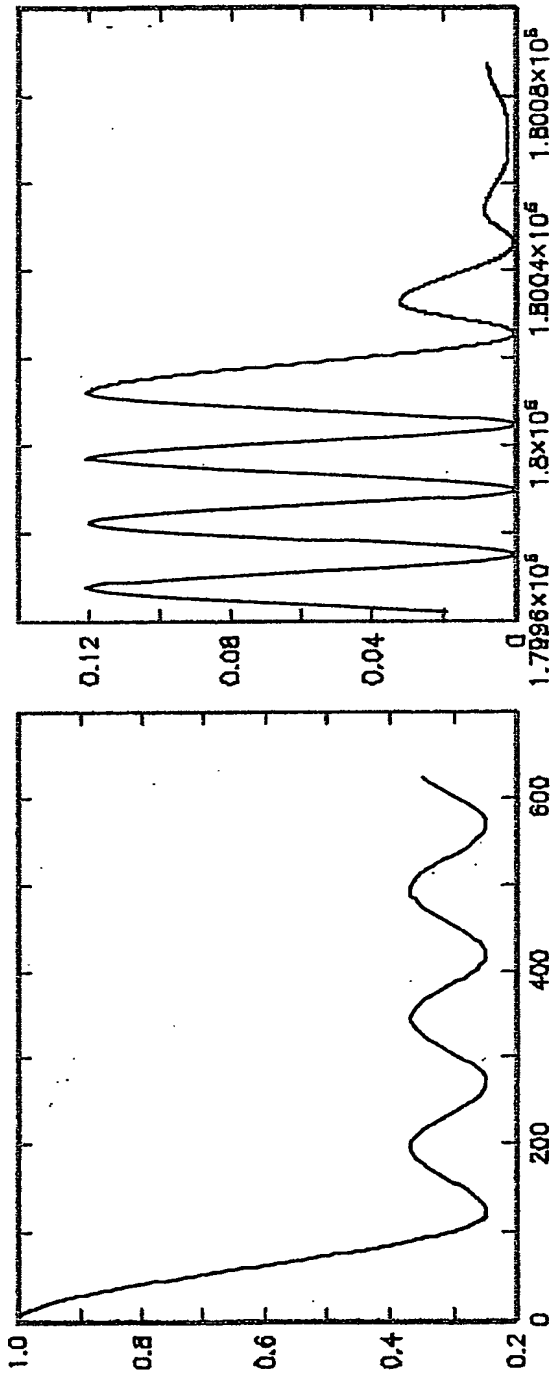

Conventional Coating
Total BarCount: 716
Standard Deviation: 0.31
BarCount
0
50
100
150
200
250
300
350
0.1
0.4
0.7
1
1.3
1.6
1.9
2.2
2.5
Reflectance [%]

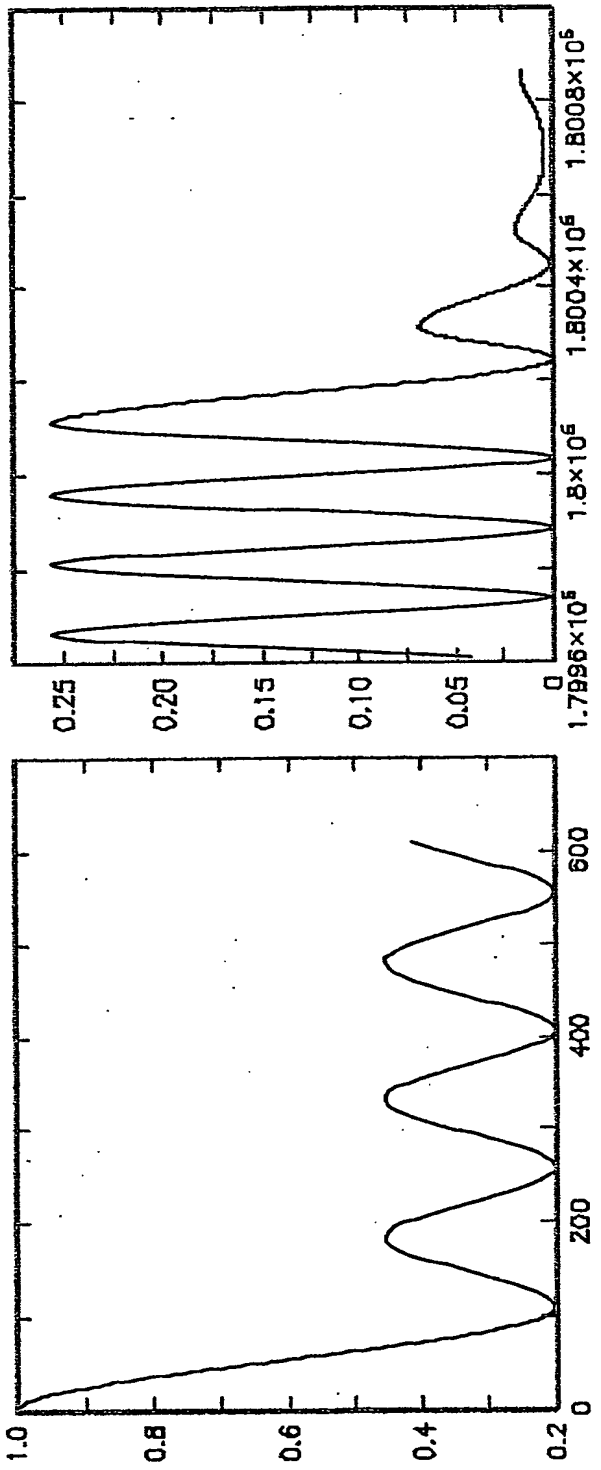
Fig. 4 (b)


Phase-Shifting Quarter-Wave Coating
Total BarCount: 2237
Standard Deviation: 0.01
8 Bars with 1.1%
BarCount
0
500
1000
1500
2000
2500
0.1
0.4
0.7
1
1.3
1.6
1.9
2.2
2.5
Reflectance [%]



Phase Shifting Quarter Wave Coating with a 1 % Reflectance

Fig. 5



Phase Shifting Quarter Wave Coating with a 4 % Reflectance

Fig. 6

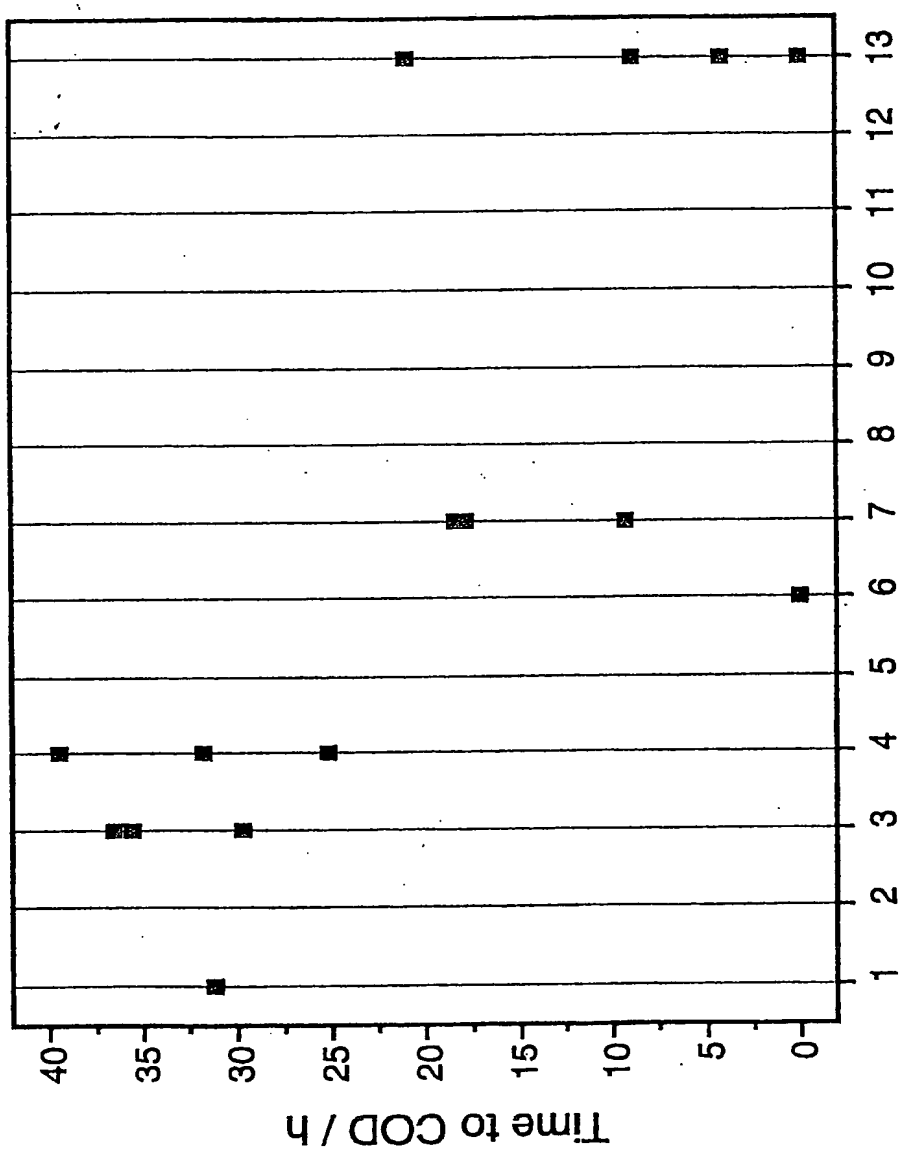

Time to COD / h
0
5
10
15
20
25
30
35
40
# of QW Exp.
1
2
3
4
5
6
7
8
9
10
11
12
13
Time to COD vs. # of QW Exp

Fig. 7

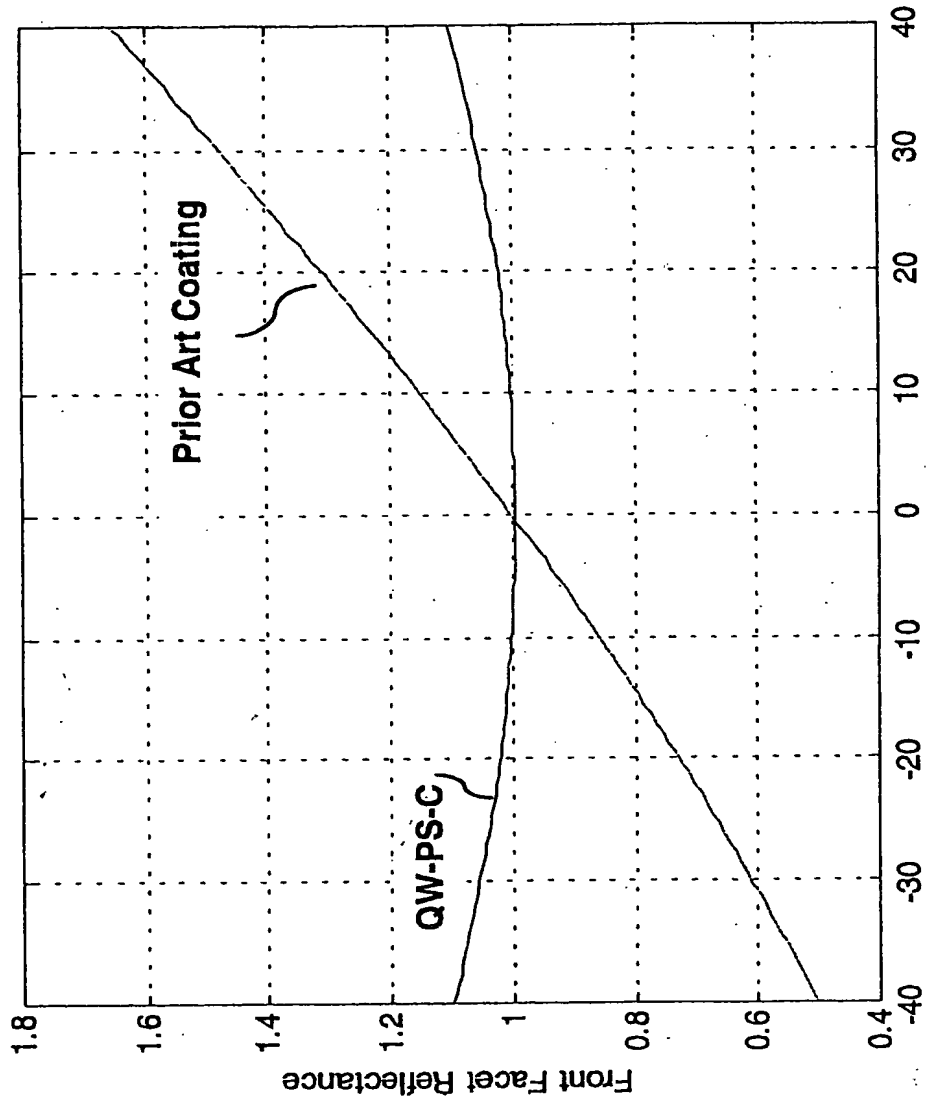
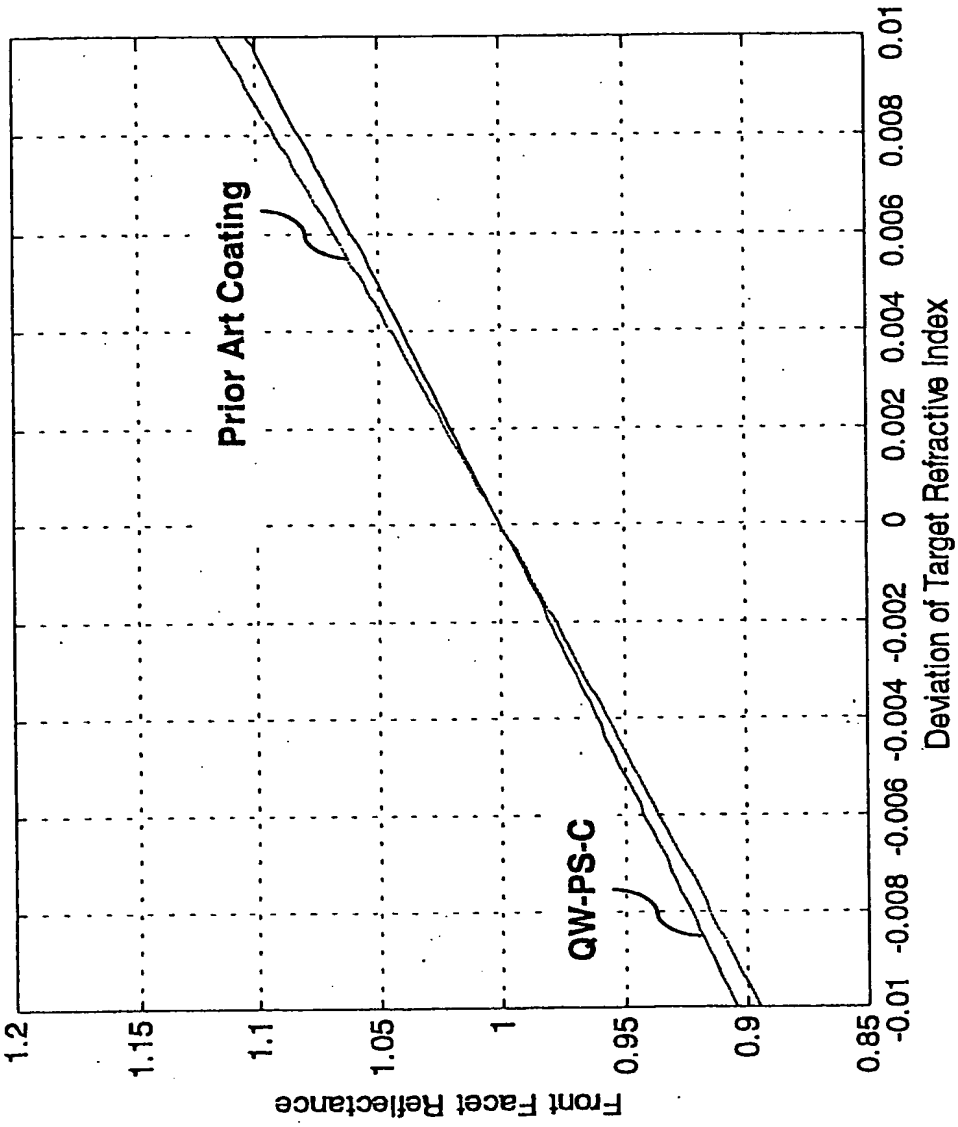

Prior Art Coating
QW-PS-C
Front Facet Reflectance
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
-40
-30
-20
-10
0
10
20
30
40
Standard Deviation of Thickness
Dependence of reflectance on thickness variation

Fig. 8



Dependence of Reflectance on index variation

Fig. 9

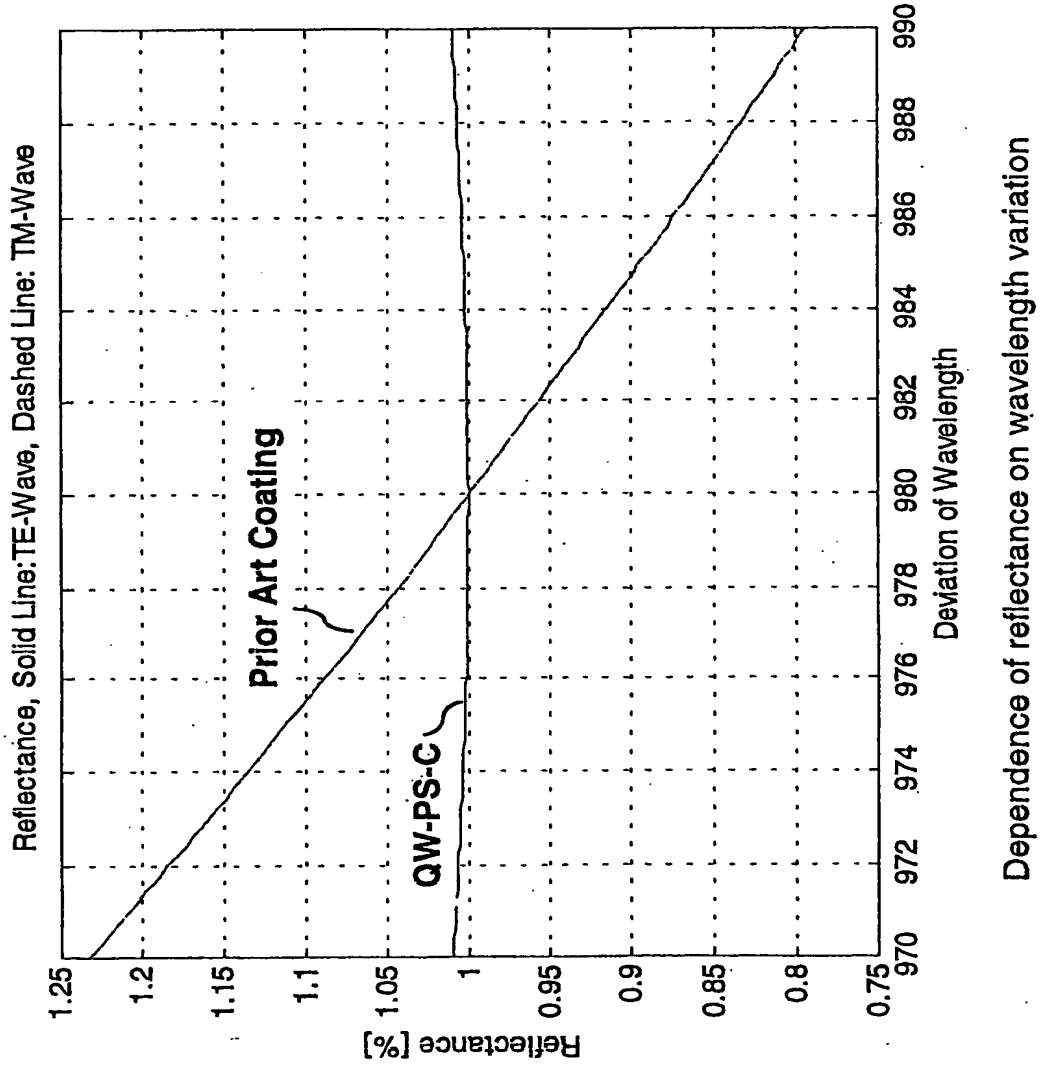

Reflectance, Solid Line:TE-Wave, Dashed Line: TM-Wave
Prior Art Coating
QW-PS-C
Reflectance [%]
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
0.75
970
972
974
976
978
980
982
984
986
988
990
Deviation of Wavelength
Dependence of reflectance on wavelength variation

Fig. 10

Fig. 11

Process parameters

Reflectivity R	index of refraction n	Substrate Temperature T_S (°C)	Pressure P (Torr)	Plasma Power L_{plasma} (W)	nitrogen flux $n_{[N2]}$ (sccm)	ammonia flux $n_{[NH3]}$ (sccm)	silane flux(*) $n_{[SiH4]}$ (sccm)
0.05%	1.86	300	1.4	25	35	18	236
1%	2.01	300	1.4	25	35	13	403
4%	2.23	300	1.4	25	35	8.5	491
1%(**)	1.83	300	1.4	20	330	11.2	300

(*) precursor gas of 2% SiH4 diluted in Helium
(**) conventional non-$\lambda/4$ coating

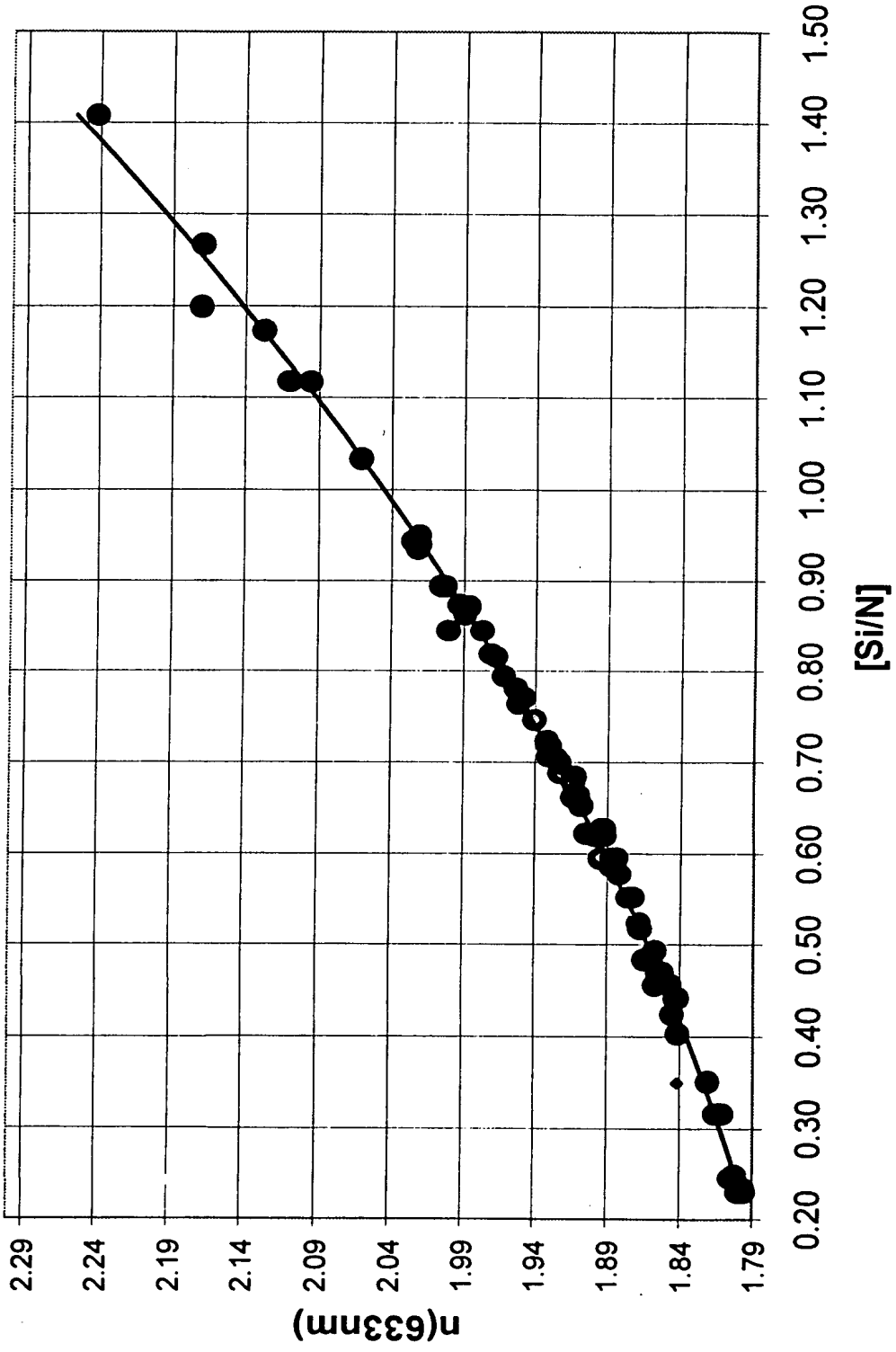

n(633nm)
2.29
2.24
2.19
2.14
2.09
2.04
1.99
1.94
1.89
1.84
1.79
[Si/N]
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
1.20
1.30
1.40
1.50

Fig. 12

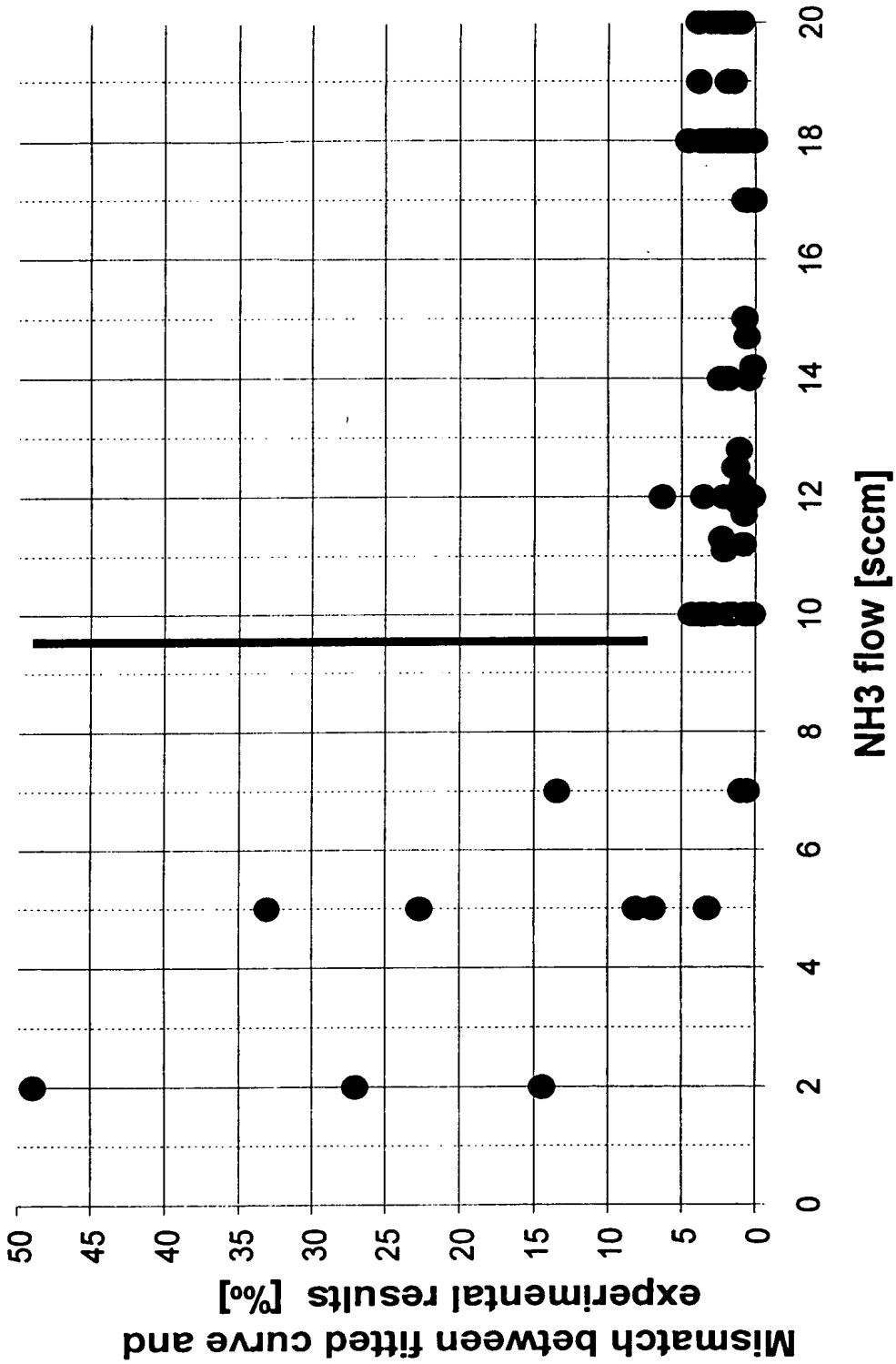

Mismatch between fitted curve and experimental results [%]
50
45
40
35
30
25
20
15
10
5
0
NH3 flow [sccm]
0
2
4
6
8
10
12
14
16
18
20

Fig. 13